

Sequence Listing
SEQUENCE LISTING

<110> Byrne, Barry J.
Mah, Cathryn S.

<120> rAAV COMPOSITIONS AND METHODS FOR DELIVERY OF HUMAN FACTOR VII
POLYPEPTIDES AND TREATMENT OF HEMOPHILIA A

<130> 4300.014300

<140> UNKNOWN
<141> 2004-12-28

<150> PCT/US03/20756
<151> 2003-06-30

<150> 60/392,725
<151> 2002-06-28

<160> 17

<170> PatentIn version 3.2

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<211> 1440
<212> DNA
<213> Homo sapiens

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Sequence Listing

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<210> 2
<211> 466
<212> PRT
<213> Homo sapiens

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<400> 2

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Met Val Ser Gln Ala Leu Arg Leu Leu Cys Leu Leu Leu Gly Leu Gln
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Gly Cys Leu Ala Ala Gly Gly Val Ala Lys Ala Ser Gly Gly Glu Thr
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Arg Asp Met Pro Trp Lys Pro Gly Pro His Arg Val Phe Val Thr Gln
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Glu Glu Ala His Gly Val Leu His Arg Arg Arg Arg Ala Asn Ala Phe
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Leu Glu Glu Leu Arg Pro Gly Ser Leu Glu Arg Glu Cys Lys Glu Glu
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Gln Cys Ser Phe Glu Glu Ala Arg Glu Ile Phe Lys Asp Ala Glu Arg
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Thr Lys Leu Phe Trp Ile Ser Tyr Ser Asp Gly Asp Gln Cys Ala Ser
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Ser Pro Cys Gln Asn Gly Gly Ser Cys Lys Asp Gln Leu Gln Ser Tyr
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Ile Cys Phe Cys Leu Pro Ala Phe Glu Gly Arg Asn Cys Glu Thr His
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Lys Asp Asp Gln Leu Ile Cys Val Asn Glu Asn Gly Gly Cys Glu Gln
          145          150          155          160

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Tyr Cys Ser Asp His Thr Gly Thr Lys Arg Ser Cys Arg Cys His Glu

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Sequence Listing

165

170

175

Gly Tyr Ser Leu Leu Ala Asp Gly Val Ser Cys Thr Pro Thr Val Glu
180 185 190

Tyr Pro Cys Gly Lys Ile Pro Ile Leu Glu Lys Arg Asn Ala Ser Lys
195 200 205

Pro Gln Gly Arg Ile Val Gly Gly Lys Val Cys Pro Lys Gly Glu Cys
210 215 220

Pro Trp Gln Val Leu Leu Leu Val Asn Gly Ala Gln Leu Cys Gly Gly
225 230 235 240

Thr Leu Ile Asn Thr Ile Trp Val Val Ser Ala Ala His Cys Phe Asp
245 250 255

Lys Ile Lys Asn Trp Arg Asn Leu Ile Ala Val Leu Gly Glu His Asp
260 265 270

Leu Ser Glu His Asp Gly Asp Glu Gln Ser Arg Arg Val Ala Gln Val
275 280 285

Ile Ile Pro Ser Thr Tyr Val Pro Gly Thr Thr Asn His Asp Ile Ala
290 295 300

Leu Leu Arg Leu His Gln Pro Val Val Leu Thr Asp His Val Val Pro
305 310 315 320

Leu Cys Leu Pro Glu Arg Thr Phe Ser Glu Arg Thr Leu Ala Phe Val
325 330 335

Arg Phe Ser Leu Val Ser Gly Trp Gly Gln Leu Leu Asp Arg Gly Ala
340 345 350

Thr Ala Leu Glu Leu Met Val Leu Asn Val Pro Arg Leu Met Thr Gln
355 360 365

Asp Cys Leu Gln Gln Ser Arg Lys Val Gly Asp Ser Pro Asn Ile Thr
370 375 380

Glu Tyr Met Phe Cys Ala Gly Tyr Ser Asp Gly Ser Lys Asp Ser Cys
385 390 395 400

Lys Gly Asp Ser Gly Gly Pro His Ala Thr His Tyr Arg Gly Thr Trp
405 410 415

Sequence Listing

Tyr Leu Thr Gly Ile Val Ser Trp Gly Gln Gly Cys Ala Thr Val Gly
420 425 430

His Phe Gly Val Tyr Thr Arg Val Ser Gln Tyr Ile Glu Trp Leu Gln
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Lys Leu Met Arg Ser Glu Pro Arg Pro Gly Val Leu Leu Arg Ala Pro
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Phe Pro
465

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<211> 1401
<212> DNA
<213> Homo sapiens

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Sequence Listing

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 ctgcgagccc catttccta g 1401

<210> 4
 <211> 466
 <212> PRT
 <213> Homo sapiens

<400> 4

Met Val Ser Gln Ala Leu Arg Leu Leu Cys Leu Leu Leu Gly Leu Gln
 1 5 10 15

Gly Cys Leu Ala Ala Gly Gly Val Ala Lys Ala Ser Gly Gly Glu Thr
 20 25 30

Arg Asp Met Pro Trp Lys Pro Gly Pro His Arg Val Phe Val Thr Gln
 35 40 45

Glu Glu Ala His Gly Val Leu His Arg Arg Arg Arg Ala Asn Ala Phe
 50 55 60

Leu Glu Glu Leu Arg Pro Gly Ser Leu Glu Arg Glu Cys Lys Glu Glu
 65 70 75 80

Gln Cys Ser Phe Glu Glu Ala Arg Glu Ile Phe Lys Asp Ala Glu Arg
 85 90 95

Thr Lys Leu Phe Trp Ile Ser Tyr Ser Asp Gly Asp Gln Cys Ala Ser
 100 105 110

Ser Pro Cys Gln Asn Gly Gly Ser Cys Lys Asp Gln Leu Gln Ser Tyr
 115 120 125

Ile Cys Phe Cys Leu Pro Ala Phe Glu Gly Arg Asn Cys Glu Thr His
 130 135 140

Lys Asp Asp Gln Leu Ile Cys Val Asn Glu Asn Gly Gly Cys Glu Gln
 145 150 155 160

Tyr Cys Ser Asp His Thr Gly Thr Lys Arg Ser Cys Arg Cys His Glu
 165 170 175

Gly Tyr Ser Leu Leu Ala Asp Gly Val Ser Cys Thr Pro Thr Val Glu
 180 185 190

Sequence Listing

Tyr Pro Cys Gly Lys Ile Pro Ile Leu Glu Lys Arg Asn Ala Ser Lys
195 200 205

Pro Gln Gly Arg Ile Val Gly Gly Lys Val Cys Pro Lys Gly Glu Cys
210 215 220

Pro Trp Gln Val Leu Leu Leu Val Asn Gly Ala Gln Leu Cys Gly Gly
225 230 235 240

Thr Leu Ile Asn Thr Ile Trp Val Val Ser Ala Ala His Cys Phe Asp
245 250 255

Lys Ile Lys Asn Trp Arg Asn Leu Ile Ala Val Leu Gly Glu His Asp
260 265 270

Leu Ser Glu His Asp Gly Asp Glu Gln Ser Arg Arg Val Ala Gln Val
275 280 285

Ile Ile Pro Ser Thr Tyr Val Pro Gly Thr Thr Asn His Asp Ile Ala
290 295 300

Leu Leu Arg Leu His Gln Pro Val Val Leu Thr Asp His Val Val Pro
305 310 315 320

Leu Cys Leu Pro Glu Arg Thr Phe Ser Glu Arg Thr Leu Ala Phe Val
325 330 335

Arg Phe Ser Leu Val Ser Gly Trp Gly Gln Leu Leu Asp Arg Gly Ala
340 345 350

Thr Ala Leu Glu Leu Met Val Leu Asn Val Pro Arg Leu Met Thr Gln
355 360 365

Asp Cys Leu Gln Gln Ser Arg Lys Val Gly Asp Ser Pro Asn Ile Thr
370 375 380

Glu Tyr Met Phe Cys Ala Gly Tyr Ser Asp Gly Ser Lys Asp Ser Cys
385 390 395 400

Lys Gly Asp Ser Gly Gly Pro His Ala Thr His Tyr Arg Gly Thr Trp
405 410 415

Tyr Leu Thr Gly Ile Val Ser Trp Gly Gln Gly Cys Ala Thr Val Gly
420 425 430

His Phe Gly Val Tyr Thr Arg Val Ser Gln Tyr Ile Glu Trp Leu Gln
435 440 445

Sequence Listing

Lys Leu Met Arg Ser Glu Pro Arg Pro Gly Val Leu Leu Arg Ala Pro
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Phe Pro
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<211> 1335
<212> DNA
<213> Homo sapiens

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Sequence Listing

<211> 444
<212> PRT
<213> Homo sapiens

<400> 6

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Leu His Arg Arg Arg Arg Ala Asn Ala Phe Leu Glu Glu Leu Arg Pro
35 40 45

Gly Ser Leu Glu Arg Glu Cys Lys Glu Glu Gln Cys Ser Phe Glu Glu
50 55 60

Ala Arg Glu Ile Phe Lys Asp Ala Glu Arg Thr Lys Leu Phe Trp Ile
65 70 75 80

Ser Tyr Ser Asp Gly Asp Gln Cys Ala Ser Ser Pro Cys Gln Asn Gly
85 90 95

Gly Ser Cys Lys Asp Gln Leu Gln Ser Tyr Ile Cys Phe Cys Leu Pro
100 105 110

Ala Phe Glu Gly Arg Asn Cys Glu Thr His Lys Asp Asp Gln Leu Ile
115 120 125

Cys Val Asn Glu Asn Gly Gly Cys Glu Gln Tyr Cys Ser Asp His Thr
130 135 140

Gly Thr Lys Arg Ser Cys Arg Cys His Glu Gly Tyr Ser Leu Leu Ala
145 150 155 160

Asp Gly Val Ser Cys Thr Pro Thr Val Glu Tyr Pro Cys Gly Lys Ile
165 170 175

Pro Ile Leu Glu Lys Arg Asn Ala Ser Lys Pro Gln Gly Arg Ile Val
180 185 190

Gly Gly Lys Val Cys Pro Lys Gly Glu Cys Pro Trp Gln Val Leu Leu
195 200 205

Leu Val Asn Gly Ala Gln Leu Cys Gly Gly Thr Leu Ile Asn Thr Ile
210 215 220

Trp Val Val Ser Ala Ala His Cys Phe Asp Lys Ile Lys Asn Trp Arg
Page 8

225 230 235 240

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Asp	Glu	Gln	Ser	Arg	Arg	Val	Ala	Gln	Val	Ile	Ile	Pro	Ser	Thr	Tyr
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Val	Pro	Gly	Thr	Thr	Asn	His	Asp	Ile	Ala	Leu	Leu	Arg	Leu	His	Gln
		275					280					285			
Pro	Val	Val	Leu	Thr	Asp	His	Val	Val	Pro	Leu	Cys	Leu	Pro	Glu	Arg
	290					295					300				
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Gly	Trp	Gly	Gln	Leu	Leu	Asp	Arg	Gly	Ala	Thr	Ala	Leu	Glu	Leu	Met
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Arg	Lys	Val	Gly	Asp	Ser	Pro	Asn	Ile	Thr	Glu	Tyr	Met	Phe	Cys	Ala
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Ser	Trp	Gly	Gln	Gly	Cys	Ala	Thr	Val	Gly	His	Phe	Gly	Val	Tyr	Thr
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Sequence Listing						
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<210> 8
 <211> 446
 <212> PRT
 <213> Rattus norvegicus

<400> 8

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His Gly Val Leu His Arg Gln Arg Arg Ala Asn Ser Leu Leu Glu Glu
 35 40 45

Sequence Listing

Leu Trp Ser Ser Ser Leu Glu Arg Glu Cys Asn Glu Glu Arg Cys Ser
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 Phe Trp Thr Ile Tyr Ser Asp Gly Asp Gln Cys Ala Ser Asn Pro Cys
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 Gln Asn Gly Gly Thr Cys Gln Asp His Leu Lys Ser Tyr Val Cys Phe
 100 105 110
 Cys Pro Leu Asp Phe Glu Gly Arg Asn Cys Glu Lys Asn Lys Asn Glu
 115 120 125
 Gln Leu Ile Cys Ala Asn Glu Asn Gly Asp Cys Asp Gln Tyr Cys Arg
 130 135 140
 Asp His Val Gly Thr Lys Arg Thr Cys Ser Cys His Glu Asp Tyr Val
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 Gly Arg Ile Pro Val Val Glu Lys Arg Asn Phe Ser Arg Pro Gln Gly
 180 185 190
 Arg Ile Val Gly Gly Tyr Val Cys Pro Lys Gly Glu Cys Pro Trp Gln
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 Asp Thr Arg Trp Ile Val Thr Ala Ala His Cys Phe Asp Lys Phe Gly
 225 230 235 240
 Lys Leu Val Asn Ile Thr Val Val Leu Gly Glu His Asp Phe Ser Glu
 245 250 255
 Lys Glu Gly Thr Glu Gln Val Arg Leu Val Glu Gln Val Ile Met Pro
 260 265 270
 Asn Lys Tyr Thr Arg Gly Arg Thr Asp His Asp Ile Ala Leu Val Arg
 275 280 285
 Leu His Arg Pro Val Thr Phe Thr Asp Tyr Val Val Pro Leu Cys Leu
 290 295 300

Sequence Listing

Pro Glu Arg Ala Phe Ser Glu Asn Thr Leu Ala Ser Ile Arg Phe Ser
305 310 315 320

Arg Val Ser Gly Trp Gly Gln Leu Leu Asp Arg Gly Ala Thr Ala Leu
325 330 335

Glu Leu Met Val Ile Glu Val Pro Arg Leu Met Thr Gln Asp Cys Leu
340 345 350

Glu His Ala Lys His Ser Ala Asn Thr Pro Arg Ile Thr Glu Asn Met
355 360 365

Phe Cys Ala Gly Tyr Met Asp Gly Thr Lys Asp Ala Cys Lys Gly Asp
370 375 380

Ser Gly Gly Pro His Ala Thr His Tyr His Gly Thr Trp Tyr Leu Thr
385 390 395 400

Gly Val Val Ser Trp Gly Glu Gly Cys Ala Ala Ile Gly His Ile Gly
405 410 415

Val Tyr Thr Arg Val Ser Gln Tyr Ile Asp Trp Leu Val Lys Tyr Met
420 425 430

Asp Ser Lys Leu Arg Val Gly Ile Ser Arg Val Ser Leu Leu
435 440 445

<210> 9
<211> 1671
<212> DNA
<213> Danio rerio

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Sequence Listing

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tgggggaaaag gctgcgctcg cccgggctcc tacggcatct acacacgcgt gtccaactac 1260
ctgcagtgga tccgacaaac aaccaacacc acgatacact gatgaagaca tgacccgggt 1320
gcattgctca tcaagattgc tactcttagg tgaacaatta acaaataatta actattatag 1380
ttaatgtttg taaaaaatag caaaattata ttgaaaataa aaaatattta tattaattat 1440
gaagtgcagg cgattacttt aattatccaa gacggtgtta tagcccaaaa tacccaatag 1500
ttgagcatca gctgctttcc tgacatcctg tacatattag actcggatct gatattttgc 1560
acaggttata ttgcatTTTT agcaggatatt taatgatttt gctctgatta atcaggagat 1620
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<210> 10
 <211> 433
 <212> PRT
 <213> Danio rerio

<400> 10

Met Ser Leu Leu Leu Val Phe Ser Leu Leu Trp Ser Leu His Tyr Cys
 1 5 10 15

His Ser Ala Ala Val Phe Val His Arg Asp Glu Ala His Glu Val Leu
 20 25 30

Ile Arg Ser Lys Arg Ala Asn Ser Gly Trp Phe Glu Glu Leu Lys Thr
 35 40 45

Gly Asn Leu Glu Arg Glu Cys Leu Glu Glu Lys Cys Ser Tyr Glu Glu
 50 55 60

Ala Arg Glu Val Phe Glu His Thr Glu Ala Thr Asn Glu Phe Trp Lys
 65 70 75 80

Sequence Listing

Ile Tyr Asp Val Lys Asp His Cys Ala Ser Ser Pro Cys Glu His Asp
85 90 95

Gly Leu Cys Thr Thr Gln Asn Ala Asp Ser Tyr Met Cys Leu Cys Ala
100 105 110

Pro Gly Phe Ser Gly Arg His Cys Glu Gln Ser Ile Gly Asp Val Leu
115 120 125

Asp Ser Cys Leu His Asp Asn Gly Gly Cys Glu His Phe Cys Thr Glu
130 135 140

Gln Asp Gly Arg Arg Asn Cys Ser Cys Ala Asp Gly Tyr Tyr Leu Asp
145 150 155 160

Asn Ser Gly Gln Lys Cys Arg Ser His Glu Val Phe Pro Cys Gly Lys
165 170 175

Val Pro Leu Leu Gln Ala Gly Lys Ala Ala Asp His Gln Val Asp Leu
180 185 190

Arg Ser Arg Ile Val Gly Gly Ser Glu Cys Pro Lys Gly His Cys Pro
195 200 205

Trp Gln Val Leu Leu Lys Tyr Gly Glu Lys Gly Phe Cys Gly Gly Val
210 215 220

Ile Tyr Lys Pro Thr Trp Ile Leu Thr Ala Ala His Cys Leu Glu Lys
225 230 235 240

Leu Lys Val Lys Phe Leu Arg Ile Val Ala Gly Glu His Asp Leu Glu
245 250 255

Val Asp Glu Gly Thr Glu Gln Leu Ile Gln Val Asp Gln Met Phe Thr
260 265 270

His Pro Ala Tyr Val Ser Glu Thr Ala Asp Ser Asp Ile Ala Leu Leu
275 280 285

Arg Leu Arg Thr Pro Ile Val Tyr Ser Val Tyr Ala Val Pro Val Cys
290 295 300

Leu Pro Leu Arg Glu Met Ala Glu Arg Glu Leu Trp Ala Val Ser Lys
305 310 315 320

His Thr Val Ser Gly Trp Gly Lys Arg Ser Glu Asp Gly Pro Thr Ser
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Sequence Listing

325

330

335

Arg Leu Leu Arg Arg Leu Leu Val Pro Arg Ile Arg Thr Gln Glu Cys
340 345 350

Val Gln Val Ser Asn Leu Thr Leu Thr Ser Asn Met Phe Cys Ala Gly
355 360 365

Tyr Ile Glu Gly Arg Gln Asp Ser Cys Lys Gly Asp Ser Gly Gly Pro
370 375 380

Leu Val Thr Arg Tyr Arg Asp Thr Ala Phe Leu Leu Gly Ile Val Ser
385 390 395 400

Trp Gly Lys Gly Cys Ala Arg Pro Gly Ser Tyr Gly Ile Tyr Thr Arg
405 410 415

Val Ser Asn Tyr Leu Gln Trp Ile Arg Gln Thr Thr Asn Thr Thr Ile
420 425 430

His

<210> 11
<211> 1341
<212> DNA
<213> Mus musculus

<400> 11
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cgtgccaaact cactcctgga ggagctttgg cccggctctc tggagagaga gtgcaatgag 180
gaacagtgct cctttgagga ggcccgggag atcttcaaga gccctgagag gaccaagcag 240
ttctggattg tttacagtga tggggaccag tgtgcctcga atccatgtca gaacgtaggt 300
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aactgtgaga aaagcaagaa tgagcagctg atctgtgcaa atgaaaatgg tgactgtgac 420
cagtactgca gggaccatgt agggaccaag cgtacctgta gctgtcatga ggactacacg 480
ctacagccag atgaggtgtc ctgcaaacca aaagttgagt acccgtgtgg gagaatacct 540
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cccaaagggg agtgtccatg gcaggctgtg ctgaaaatca atggggttatt gctgtgtggg 660
gccgtcctgc tggacgccag atggatagt accgcagccc actgcttcga taatatccgc 720
tactggggaa acatcacagt ggtgatgggt gaacatgact tcagtgagaa ggatggggat 780

Sequence Listing

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ggtgtggtca gctgggggga gggctgtgca gctattggtc acattggggg gtacaccagg     1260
gtctccagtc acatagactg gctgggtcaga cacatggact ccaagctcca gggtgggggt     1320
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<210> 12
 <211> 446
 <212> PRT
 <213> Mus musculus

<400> 12

Met Val Pro Gln Ala His Gly Leu Leu Leu Leu Cys Phe Leu Leu Gln
 1 5 10 15

Leu Gln Gly Pro Leu Gly Thr Ala Val Phe Ile Thr Gln Glu Glu Ala
 20 25 30

His Gly Val Leu His Arg Gln Arg Arg Ala Asn Ser Leu Leu Glu Glu
 35 40 45

Leu Trp Pro Gly Ser Leu Glu Arg Glu Cys Asn Glu Glu Gln Cys Ser
 50 55 60

Phe Glu Glu Ala Arg Glu Ile Phe Lys Ser Pro Glu Arg Thr Lys Gln
 65 70 75 80

Phe Trp Ile Val Tyr Ser Asp Gly Asp Gln Cys Ala Ser Asn Pro Cys
 85 90 95

Gln Asn Val Gly Thr Cys Gln Asp His Leu Lys Ser Tyr Val Cys Phe
 100 105 110

Cys Leu Leu Asp Phe Glu Gly Arg Asn Cys Glu Lys Ser Lys Asn Glu
 115 120 125

Gln Leu Ile Cys Ala Asn Glu Asn Gly Asp Cys Asp Gln Tyr Cys Arg
 130 135 140

Sequence Listing

Asp His Val Gly Thr Lys Arg Thr Cys Ser Cys His Glu Asp Tyr Thr
 145 150 155 160
 Leu Gln Pro Asp Glu Val Ser Cys Lys Pro Lys Val Glu Tyr Pro Cys
 165 170 175
 Gly Arg Ile Pro Val Val Glu Lys Arg Asn Ser Ser Ser Arg Gln Gly
 180 185 190
 Arg Ile Val Gly Gly Asn Val Cys Pro Lys Gly Glu Cys Pro Trp Gln
 195 200 205
 Ala Val Leu Lys Ile Asn Gly Leu Leu Leu Cys Gly Ala Val Leu Leu
 210 215 220
 Asp Ala Arg Trp Ile Val Thr Ala Ala His Cys Phe Asp Asn Ile Arg
 225 230 235 240
 Tyr Trp Gly Asn Ile Thr Val Val Met Gly Glu His Asp Phe Ser Glu
 245 250 255
 Lys Asp Gly Asp Glu Gln Val Arg Arg Val Thr Gln Val Ile Met Pro
 260 265 270
 Asp Lys Tyr Ile Arg Gly Lys Ile Asn His Asp Ile Ala Leu Leu Arg
 275 280 285
 Leu His Arg Pro Val Thr Phe Thr Asp Tyr Val Val Pro Leu Cys Leu
 290 295 300
 Pro Glu Lys Ser Phe Ser Glu Asn Thr Leu Ala Arg Ile Arg Phe Ser
 305 310 315 320
 Arg Val Ser Gly Trp Gly Gln Leu Leu Asp Arg Gly Ala Thr Ala Leu
 325 330 335
 Glu Leu Met Ser Ile Glu Val Pro Arg Leu Met Thr Gln Asp Cys Leu
 340 345 350
 Glu His Ala Lys His Ser Ser Asn Thr Pro Lys Ile Thr Glu Asn Met
 355 360 365
 Phe Cys Ala Gly Tyr Met Asp Gly Thr Lys Asp Ala Cys Lys Gly Asp
 370 375 380
 Ser Gly Gly Pro His Ala Thr His Tyr His Gly Thr Trp Tyr Leu Thr
 385 390 395 400

Sequence Listing

Gly Val Val Ser Trp Gly Glu Gly Cys Ala Ala Ile Gly His Ile Gly
405 410 415

Val Tyr Thr Arg Val Ser Gln Tyr Ile Asp Trp Leu Val Arg His Met
420 425 430

Asp Ser Lys Leu Gln Val Gly Val Phe Arg Leu Pro Leu Leu
435 440 445

<210> 13
<211> 1260
<212> DNA
<213> Gallus gallus

<400> 13
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ttctgtgcag gagacctgac cggtaaaaaa gactcctgca agggagacag tgggtggacct 1140
cacgctacaa agtacaagaa cacctggttt ctgactggga ttgtcagctg gggaaaggg 1200
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Sequence Listing

<210> 14
 <211> 425
 <212> PRT
 <213> Gallus gallus

<400> 14

Met Val Ser Arg Gln Cys Val Ala Leu Leu Leu Cys Phe Pro Leu Leu
 1 5 10 15

Val Pro Pro Ser Leu Glu Ala Val Phe Leu Lys Gln Glu Glu Ala Asn
 20 25 30

Ser Ile Phe Gln Arg His Arg Arg Ala Asn Ser Phe Phe Glu Glu Ile
 35 40 45

Lys Leu Gly Pro Leu Glu Arg Glu Cys Ile Glu Glu Lys Cys Ser Phe
 50 55 60

Glu Glu Ala Arg Glu Ile Tyr Arg Asp Asp Glu Arg Thr Lys Glu Phe
 65 70 75 80

Trp His Ile Tyr Ser Asp Pro Asn Gln Cys Asp Ser Ser Pro Cys Gln
 85 90 95

Asn Gly Gly Ser Cys Asp Asp Gln Phe Gln Asp Tyr Val Cys Arg Cys
 100 105 110

Pro Pro Glu Tyr Glu Gly Lys Ser Cys Glu Thr Ala Val Ala Glu Asn
 115 120 125

Leu Lys Cys Ile Tyr Asp Asn Gly Gly Cys Glu Gln Tyr Cys Ala Asp
 130 135 140

Glu Gln Ser Glu Lys Arg Val Cys Phe Cys Ala Glu Gly Tyr Ala Leu
 145 150 155 160

Ala Ser Asp Gly Val Ser Cys Ile Pro Gln Val Lys Tyr Pro Cys Gly
 165 170 175

Thr Ile Pro Val Leu Ala Arg Lys Asn Thr Thr Ala Gln Gly Arg Ile
 180 185 190

Val Gly Gly Val Thr Cys Pro Pro Gly Glu Cys Pro Trp Gln Ala Leu
 195 200 205

Ile Ile Gln Asp Gln Lys Gly Lys Cys Gly Gly Ser Leu Leu Ser Pro
 210 215 220

Sequence Listing

Glu Trp Val Val Thr Ala Ala His Cys Leu Asp Tyr Ala His Ser Lys
225 230 235 240

Gln Leu Arg Val Arg Leu Gly Glu Tyr Ser Val Lys Val Ala Glu Lys
245 250 255

Thr Glu Gln Glu Ser Gly Val Ser Lys Ile Ile Arg His Glu Glu Tyr
260 265 270

Thr Ile Gly Gln Val Asn His Asp Ile Ala Leu Leu Lys Leu Glu Thr
275 280 285

Pro Val Asn Leu Thr Asp Phe Val Val Pro Ile Cys Leu Pro Glu Lys
290 295 300

Arg Phe Ala Val Tyr Glu Leu Ser Ser Ile Lys Phe Ser Met Val Ser
305 310 315 320

Gly Trp Gly Arg Leu Leu Asp Gly Gly Ala Thr Ser Thr Phe Leu Met
325 330 335

Arg Val His Leu Pro Arg Val Lys Thr Gln Glu Cys Glu Lys Gln Ala
340 345 350

Asn Leu Asn Ile Thr Glu Asn Met Phe Cys Ala Gly Asp Leu Thr Gly
355 360 365

Lys Lys Asp Ser Cys Lys Gly Asp Ser Gly Gly Pro His Ala Thr Lys
370 375 380

Tyr Lys Asn Thr Trp Phe Leu Thr Gly Ile Val Ser Trp Gly Lys Gly
385 390 395 400

Cys Ala Val Glu Gly Ser Tyr Gly Val Tyr Thr Arg Val Ser Arg Tyr
405 410 415

Ile Asn Trp Leu Lys Arg His Met Glu
420 425

<210> 15
<211> 443
<212> PRT
<213> Oryctolagus cuniculus

<400> 15

Met Ala Pro Gln Ala Arg Gly Leu Gly Leu Cys Ser Leu Leu Ala Leu
1 5 10 15

Sequence Listing

Gln Ala Ser Leu Ala Ala Val Phe Ile Thr Gln Glu Glu Ala His Ser
20 25 30

Val Leu Arg Arg Gln Arg Arg Ala Asn Ser Phe Leu Glu Glu Leu Arg
35 40 45

Pro Gly Ser Leu Glu Arg Glu Cys Lys Glu Glu Leu Cys Ser Phe Glu
50 55 60

Glu Ala Arg Glu Val Phe Gln Ser Thr Glu Arg Thr Lys Gln Phe Trp
65 70 75 80

Ile Thr Tyr Asn Asp Gly Asp Gln Cys Ala Ser Asn Pro Cys Gln Asn
85 90 95

Gly Gly Ser Cys Glu Asp Gln Ile Gln Ser Tyr Ile Cys Phe Cys Leu
100 105 110

Ala Asp Phe Glu Gly Arg Asn Cys Glu Lys Asn Lys Asn Asp Gln Leu
115 120 125

Ile Cys Met Tyr Glu Asn Gly Gly Cys Glu Gln Tyr Cys Ser Asp His
130 135 140

Val Gly Ser Gln Arg Ser Cys Arg Cys His Glu Gly Tyr Thr Leu Leu
145 150 155 160

Pro Asn Gly Val Ser Cys Thr Pro Thr Val Asp Tyr Pro Cys Gly Lys
165 170 175

Val Pro Ala Leu Glu Lys Arg Gly Ala Ser Asn Pro Gln Gly Arg Ile
180 185 190

Val Gly Gly Lys Val Cys Pro Lys Gly Glu Cys Pro Trp Gln Ala Ala
195 200 205

Leu Met Asn Gly Ser Thr Leu Leu Cys Gly Gly Ser Leu Leu Asp Thr
210 215 220

His Trp Val Val Ser Ala Ala His Cys Phe Asp Lys Leu Ser Ser Leu
225 230 235 240

Arg Asn Leu Thr Ile Val Leu Gly Glu His Asp Leu Ser Glu His Glu
245 250 255

Gly Asp Glu Gln Val Arg His Val Ala Gln Leu Ile Met Pro Asp Lys
260 265 270

Sequence Listing

Tyr Val Pro Gly Lys Thr Asp His Asp Ile Ala Leu Leu Arg Leu Leu
275 280 285

Gln Pro Ala Ala Leu Thr Asn Asn Val Val Pro Leu Cys Leu Pro Glu
290 295 300

Arg Asn Phe Ser Glu Ser Thr Leu Ala Thr Ile Arg Phe Ser Arg Val
305 310 315 320

Ser Gly Trp Gly Gln Leu Leu Tyr Arg Gly Ala Leu Ala Arg Glu Leu
325 330 335

Met Ala Ile Asp Val Pro Arg Leu Met Thr Gln Asp Cys Val Glu Gln
340 345 350

Ser Glu His Asn Pro Gly Ser Pro Glu Val Thr Gly Asn Met Phe Cys
355 360 365

Ala Gly Tyr Leu Asp Gly Ser Lys Asp Ala Cys Lys Gly Asp Ser Gly
370 375 380

Gly Pro His Ala Thr Ser Tyr His Gly Thr Tyr Leu Thr Gly Val Val
385 390 395 400

Ser Trp Gly Glu Gly Cys Ala Arg Val Gly His Val Gly Val Tyr Thr
405 410 415

Arg Val Ser Arg Asp Thr Glu Trp Leu Ser Arg Leu Met Arg Ser Lys
420 425 430

Leu His His Gly Ile Gln Arg His Pro Phe Pro
435 440

<210> 16
<211> 681
<212> PRT
<213> Mus musculus

<400> 16

Met Val Pro Gln Ala His Gly Leu Leu Leu Leu Cys Phe Leu Leu Gln
1 5 10 15

Leu Gln Gly Pro Leu Gly Thr Ala Val Phe Ile Thr Gln Glu Glu Ala
20 25 30

His Gly Val Leu His Arg Gln Arg Arg Ala Asn Ser Leu Leu Glu Glu
35 40 45

Sequence Listing

Leu Trp Pro Gly Ser Leu Glu Arg Glu Cys Asn Glu Glu Gln Cys Ser
 50 55 60
 Phe Glu Glu Ala Arg Glu Ile Phe Lys Ser Pro Glu Arg Thr Lys Gln
 65 70 75 80
 Phe Trp Ile Val Tyr Ser Asp Gly Asp Gln Cys Ala Ser Asn Pro Cys
 85 90 95
 Gln Asn Val Gly Thr Cys Gln Asp His Leu Lys Ser Tyr Val Cys Phe
 100 105 110
 Cys Leu Leu Asp Phe Glu Gly Arg Asn Cys Glu Lys Ser Lys Asn Glu
 115 120 125
 Gln Leu Ile Cys Ala Asn Glu Asn Gly Asp Cys Asp Gln Tyr Cys Arg
 130 135 140
 Asp His Val Gly Thr Lys Arg Thr Cys Ser Cys His Glu Asp Tyr Thr
 145 150 155 160
 Leu Gln Pro Asp Glu Val Ser Cys Lys Pro Lys Val Glu Tyr Pro Cys
 165 170 175
 Gly Arg Ile Pro Val Val Glu Lys Arg Asn Ser Ser Ser Arg Gln Gly
 180 185 190
 Arg Ile Val Gly Gly Asn Val Cys Pro Lys Gly Glu Cys Pro Trp Gln
 195 200 205
 Ala Val Leu Lys Ile Asn Gly Leu Leu Leu Cys Gly Ala Val Leu Leu
 210 215 220
 Asp Ala Arg Trp Ile Val Thr Ala Ala His Cys Phe Asp Asn Ile Arg
 225 230 235 240
 Tyr Trp Gly Asn Ile Thr Val Val Met Gly Glu His Asp Phe Ser Glu
 245 250 255
 Lys Asp Gly Asp Glu Gln Val Arg Arg Val Thr Gln Val Ile Met Pro
 260 265 270
 Asp Lys Tyr Ile Arg Gly Lys Ile Asn His Asp Ile Ala Leu Leu Arg
 275 280 285
 Leu His Arg Pro Val Thr Phe Thr Asp Tyr Val Val Pro Leu Cys Leu
 290 295 300

Sequence Listing

Pro Glu Lys Ser Phe Ser Glu Asn Thr Leu Ala Arg Ile Arg Phe Ser
 305 310 315 320
 Arg Val Ser Gly Trp Gly Gln Leu Leu Asp Arg Gly Ala Thr Ala Leu
 325 330 335
 Glu Leu Met Ser Ile Glu Val Pro Arg Leu Met Thr Gln Asp Cys Leu
 340 345 350
 Glu His Ala Lys His Ser Ser Asn Thr Pro Lys Ile Thr Glu Asn Met
 355 360 365
 Phe Cys Ala Gly Tyr Met Asp Gly Thr Lys Asp Ala Cys Ala Gly Asp
 370 375 380
 Ser Gly Gly Pro His Ala Thr His Tyr His Gly Thr Trp Tyr Leu Thr
 385 390 395 400
 Gly Val Val Ser Trp Gly Glu Gly Cys Ala Ala Ile Gly His Ile Gly
 405 410 415
 Val Tyr Thr Arg Val Ser Gln Tyr Ile Asp Trp Leu Val Arg His Met
 420 425 430
 Asp Ser Lys Leu Gln Val Gly Val Phe Arg Leu Pro Leu Leu Gly Ser
 435 440 445
 Ala Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro
 450 455 460
 Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys
 465 470 475 480
 Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val
 485 490 495
 Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr
 500 505 510
 Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu
 515 520 525
 Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
 530 535 540
 Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys

Sequence Listing

545 550 555 560

Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln
565 570 575

Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu
580 585 590

Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro
595 600 605

Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn
610 615 620

Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu
625 630 635 640

Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val
645 650 655

Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln
660 665 670

Lys Ser Leu Ser Leu Ser Pro Gly Lys
675 680

<210> 17
<211> 407
<212> PRT
<213> Bos taurus

<400> 17

Ala Asn Gly Phe Leu Glu Glu Leu Leu Pro Gly Ser Leu Glu Arg Glu
1 5 10 15

Cys Arg Glu Glu Leu Cys Ser Phe Glu Glu Ala His Glu Ile Phe Arg
20 25 30

Asn Glu Glu Arg Thr Arg Gln Phe Trp Val Ser Tyr Asn Asp Gly Asp
35 40 45

Gln Cys Ala Ser Ser Pro Cys Gln Asn Gly Gly Ser Cys Glu Asp Gln
50 55 60

Leu Arg Ser Tyr Ile Cys Phe Cys Pro Asp Gly Phe Glu Gly Arg Asn
65 70 75 80

Cys Glu Thr Asp Lys Gln Ser Gln Leu Ile Cys Ala Asn Asp Asn Gly
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Sequence Listing

85

90

95

Gly Cys Glu Gln Tyr Cys Gly Ala Asp Pro Gly Ala Gly Arg Phe Cys
 100 105 110
 Trp Cys His Glu Gly Tyr Ala Leu Gln Ala Asp Gly Val Ser Cys Ala
 115 120 125
 Pro Thr Val Glu Tyr Pro Cys Gly Lys Ile Pro Val Leu Glu Lys Arg
 130 135 140
 Asn Gly Ser Lys Pro Gln Gly Arg Ile Val Gly Gly His Val Cys Pro
 145 150 155 160
 Lys Gly Glu Cys Pro Trp Gln Ala Met Leu Lys Leu Asn Gly Ala Leu
 165 170 175
 Leu Cys Gly Gly Thr Leu Val Gly Pro Ala Trp Val Val Ser Ala Ala
 180 185 190
 His Cys Phe Glu Arg Leu Arg Ser Arg Gly Asn Leu Thr Ala Val Leu
 195 200 205
 Gly Glu His Asp Leu Ser Arg Val Glu Gly Pro Glu Gln Glu Arg Arg
 210 215 220
 Val Ala Gln Ile Ile Val Pro Lys Gln Tyr Val Pro Gly Gln Thr Asp
 225 230 235 240
 His Asp Val Ala Leu Leu Gln Leu Ala Gln Pro Val Ala Leu Gly Asp
 245 250 255
 His Val Ala Pro Leu Cys Leu Pro Asp Pro Asp Phe Ala Asp Gln Thr
 260 265 270
 Leu Ala Phe Val Arg Phe Ser Ala Val Ser Gly Trp Gly Gln Leu Leu
 275 280 285
 Glu Arg Gly Val Thr Ala Arg Lys Leu Met Val Val Leu Val Pro Arg
 290 295 300
 Leu Leu Thr Gln Asp Cys Leu Gln Gln Ser Arg Gln Arg Pro Gly Gly
 305 310 315 320
 Pro Val Val Thr Asp Asn Met Phe Cys Ala Gly Tyr Ser Asp Gly Ser
 325 330 335

Sequence Listing

Lys Asp Ala Cys Lys Gly Asp Ser Gly Gly Pro His Ala Thr Arg Phe
 340 345 350

Arg Gly Thr Trp Phe Leu Thr Gly Val Val Ser Trp Gly Glu Gly Cys
 355 360 365

Ala Ala Ala Gly His Phe Gly Ile Tyr Thr Arg Val Ser Arg Tyr Thr
 370 375 380

Ala Trp Leu Arg Gln Leu Met Gly His Pro Pro Ser Arg Gln Gly Phe
 385 390 395 400

Phe Gln Val Pro Leu Leu Pro
 405